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IS 13324 (1992): Screw feeders - General requirements [MED 6: Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment]



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भारतीय मानक

पेंच प्रभरक — सामान्य अपेक्षाएं

Indian Standard

**SCREW FEEDERS — GENERAL
REQUIREMENTS**

UDC 621.86.067.2

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Conveyors, Vertical Hoists and Bucket Elevators Sectional Committee had been approved by the Heavy Mechanical Engineering Division Council.

Feeders constitute an important component in the material handling and conveying system involved in industrial units such as thermal power plants, stockyards, coal mines, fertilizer industry and chemical industry. They play a vital role in the operation of the plant as any operational problem relating to feeders can hamper the operation, growth and economy of industrial unit. This Indian Standard has therefore been brought out to help the industrial units, manufacturers, designers and consultants to assist them in the selection of screw feeders.

A large variety of materials are used in the manufacture of screw feeders and include ferrous, non-ferrous and non-metallic materials. Clause 3, therefore, allows the use of all materials in the manufacture of screw feeders provided they are conforming to relevant Indian Standards wherever standards are available. However, the standards listed in Annex A for reference cover only the ferrous materials. The materials used in the manufacture of the screw feeders whether ferrous, non-ferrous or non-metallic shall be compatible with material to be transported and shall be as agreed between purchaser and manufacturer. The anti-corrosive treatment, if required, on the components of the screw feeders shall be as agreed between purchaser and manufacturer.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SCREW FEEDERS — GENERAL REQUIREMENTS

1 SCOPE

This standard specifies the requirements for screw feeders in sizes 125 mm to 630 mm nominal screw diameter, that are used to control the rate of flow of a bulk material from a bin or a hopper.

2 REFERENCES

The following Indian Standards are necessary adjunct to this standard:

IS No.	Title
2031 : 1962	Dimensions for shaft height for driven and driving machines
3688 : 1977	Dimensions for shaft ends (<i>first revision</i>)
5563 : 1985	Screw conveyors for industrial use (<i>first revision</i>)
12907 : 1990	Screw feeders — Purchaser's data sheet

3 MATERIALS

Unless otherwise specified or as agreed to between the manufacturer and the purchaser, all materials used in the construction of screw feeder and its supporting structure shall comply with the requirements of relevant Indian Standards where available. A list of Indian Standards, for guidance is given in Annex A.

4 DIMENSIONS

4.1 Single Screw Feeder

Dimensions of single screw feeder shall be in accordance with Table 1 read with Fig. 1 and 2.

4.2 Double Screw Feeder

Dimensions of double screw feeder shall be in accordance with Table 2 read with Fig. 3.

4.3 Pitch of Screw

The pitch of the screw of screw feeders shall be as recommended in IS 5563 : 1985.

4.4 Shaft Diameter

The diameter of the shafts of screw feeders shall be as recommended in IS 5563 : 1985.

5 DESCRIPTION OF THE BASIC ARRANGEMENT

5.0 In screw feeder, the inlet portion of the trough may be made to be flooded with the material and by the use of either a shroud in the trough or a tubular trough, only a controlled amount may be permitted to get discharged.

5.1 The screws in the feeder may be arranged in different ways (*see* Fig. 1 and 2), for example :

- a) For relatively small inlet openings, the screw may be of a standard diameter and pitch, or
- b) The screw may be tapered in diameter with its smallest diameter at the extreme feed end, or
- c) The screw may be made with an uniform standard diameter and a variable pitch, which grows larger from the extreme feed end.

5.2 The purpose of the tapered diameter or variable pitch screw shall be to achieve an even flow from all areas of the feed opening. Sometimes the pitch may be reduced towards the discharge end to provide airlock when feeding against a system pressure.

5.2.1 The capacity of tapered or variable-pitch screws may be determined by the diameter and pitch at the down-stream end of the inlet opening.

6 APPLICATION

6.0 Selection for application of a screw feeder depends upon:

- a) Nature and characteristics of the transported material;
- b) Bulk density of transported material as conveyed;
- c) Maximum capacity at which the material is to be transported (m^3/h);
- d) Particle size analysis;
- e) Overall length of the feeder;
- f) Width and length of inlet opening; and
- g) Special requirements, if any, for example, feeding against a system pressure.

6.1 Special Application

The screw feeder may be a separate unit or it may be extended by sections of normal screw conveyor to the required length (*see* Fig. 2).

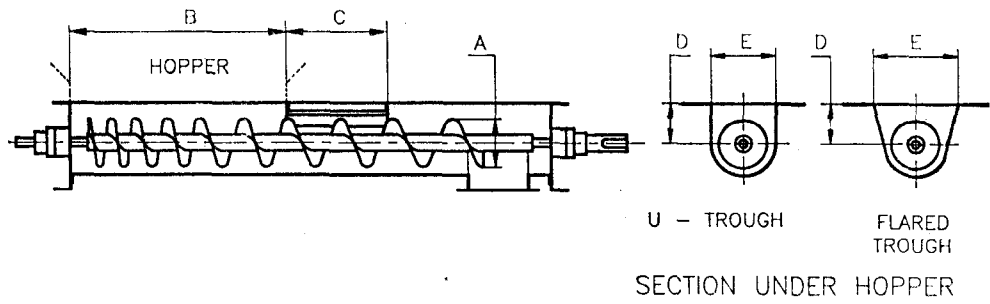


FIG. 1 SINGLE SCREW FEEDER

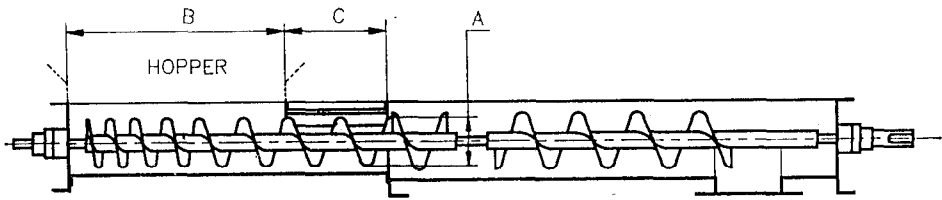
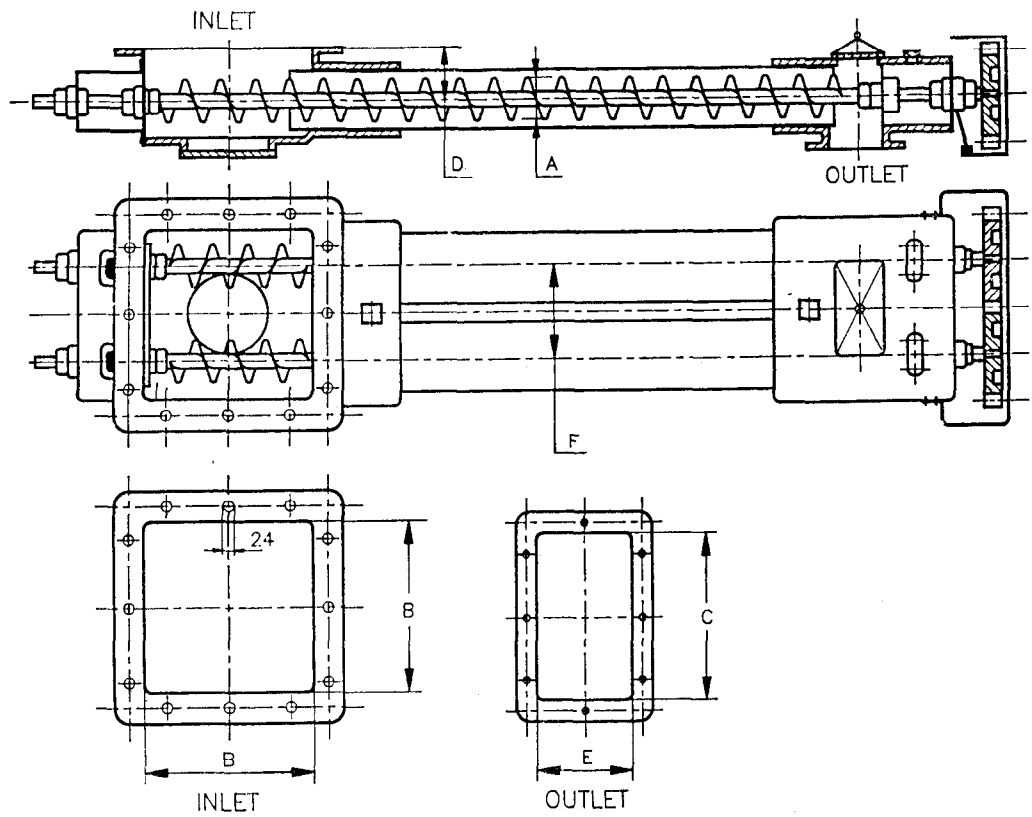


FIG. 2 SINGLE SCREW FEEDER WITH EXTENSION CONVEYOR



All dimensions in millimetres.

FIG. 3 DOUBLE SCREW FEEDER

Table 1 Dimensions of Single Screw Feeder
(Clause 4.1, and Fig. 1 and 2)

All dimensions in millimetres.

Screw Dia <i>A</i>	Recommended Maximum Speed rev/min			<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	
	Non- Abrasive Material	Slightly Abrasive Material	Highly Abrasive Material				U-trough	Flair- trough
125	160	120	80	875	250	150	145	290
160	150	110	75	960	315	180	180	360
200	140	105	70	1 000	400	200	220	400
250	130	95	65	1 140	500	224	270	500
315	115	90	60	1 220	630	270	335	560
400	100	75	50	1 420	800	315	420	710
500	90	70	45	1 520	1 000	355	530	850
630	80	60	40	1 625	1 250	450	660	1 000

Table 2 Dimensions of Double Screw Feeder
(Clause 4.2, and Fig. 3)

All dimensions in millimetres.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
125	500	500	180	200	224
160	500	500	180	200	224
200	500	500	200	200	264
250	770	520	250	210	336
300	770	550	300	250	396

6.2 Single screw feeders are most commonly used. However if inlet openings are very wide, multiple screw feeders may be more useful.

6.3 Generally screw feeders are used for feeding non-abrasive to moderately abrasive material. Screw conveyors are not recommended for handling large lumpy, easily crushable, highly abrasive, packing and sticky materials.

7 GENERAL REQUIREMENTS

7.1 The shaft of the helical screw shall be made either solid or partly tubular.

7.2 The shaft ends shall conform to IS 3688 : 1977 and shaft heights shall conform to IS 2031 : 1962.

7.3 Unless otherwise agreed to between the manufacturer and the purchaser the radial clearance between the helical screw and the interior of the trough shall be as given below:

Nominal Helical Screw Diameters, mm	Radial Clearance, mm	
	Min	Max
Up to and including 400	5.0	10.5
401 to 630	7.0	15.0

7.3.1 The radial clearance shall be chosen keeping in view the characteristics of the material to be handled and the working conditions.

7.4 Guarding

Guards shall be provided to prevent all access to the following:

- The revolving screw; and
- Rotating shafts and couplings, chains and chain wheels, gears, driving belts, pulleys, etc.

7.4.1 Size of Mesh or Opening and Clearance

The maximum clearance between the guard and the moving parts in relation to the size of opening in guards of perforated metal, woven wire or similar material shall be in accordance with the following requirements:

Size of Opening mm	Minimum Clearance mm
Not exceeding 10	25
Over 10 up to and including 13	65
Over 13 up to and including 30	100
Over 30 up to and including 38	130

7.4.2 Guards shall enclose totally all the parts referred to in 7.4 or shall, as far as practicable, prevent access to the part.

7.5 Emergency Stopping and Safe Re-starting

Suitable means shall be provided for stopping the feeder in an emergency at any point throughout its length where access is possible. Provision shall also be made for its safe re-starting.

7.6 As far as possible, drive shall be provided at discharge end.

7.7 It shall be preferable to provide reverse flight at discharge end near gland (for better life of gland).

8 DESIGNATION

A single screw feeder of 315 mm nominal diameter shall be designated as:

SSF 315 IS 13324

9 MARKING

Screw feeder shall be marked with manufacturers' name or his recognized trade-mark, identification mark, nominal diameter of screw feeder and with any other information required by purchaser.

10 INFORMATION TO BE SUPPLIED WITH ENQUIRY OR ORDER

The purchaser shall supply information in accordance with IS 12907 : 1990 along with enquiry and order.

ANNEX A

(Clause 2)

INDIAN STANDARD SPECIFICATION ON MATERIALS

A-1 STRUCTURAL STEEL

IS No.	Title
226 : 1975	Structural steel (standard quality) (<i>fifth revision</i>)
808 : 1989	Dimensions for rolled steel steel beam, colum channel and angle sections (<i>third revision</i>)
811 : 1988	Cold formed light gauge structural steel sections (<i>revised</i>)
961 : 1975	Structural steel (high tensile) (<i>second revision</i>)
1161 : 1979	Steel tubes for structural purposes (<i>third revision</i>)
1239 (Part 1) : 1979	Mild, steel tubes, tubulars and other wrought steel fittings: Part 1 Mild steel tubes (<i>fourth revision</i>)
1239 (Part 2) : 1982	Mild steel tubes, tubulars and other wrought steel fittings: Part 2 Mild steel tubulars and other wrought steel pipe fittings (<i>third revision</i>)
1252 : 1958	Rolled steel sections — Bulb angles
2062 : 1984	Weldable structural steel (<i>third revision</i>)
3039 : 1988	Structural steels for construction of hulls of ships (<i>first revision</i>)
3443 : 1980	Crane rail sections (<i>first revision</i>)
3601 : 1984	Steel tubes for mechanical and general engineering purposes (<i>first revision</i>)
3954 : 1966	Hot rolled steel channel sections for general engineering purposes
4923 : 1985	Hollow steel sections for structural use (<i>first revision</i>)

A-2 FORGINGS AND CASTINGS

210 : 1978	Grey iron castings (<i>third revision</i>)
1030 : 1989	Carbon steel castings for general engineering purposes (<i>fourth revision</i>)
1865 : 1991	Iron castings with spheroidal or nodular graphite (<i>second revision</i>)
2004 : 1978	Carbon steel forgings for general engineering purposes (<i>second revision</i>)
2107 : 1977	Whiteheart malleable iron castings (<i>first revision</i>)
4367 : 1991	Alloy steel forgings for general industrial use (<i>first revision</i>)
4771 : 1985	Abrasion-resistant iron castings (<i>second revision</i>)
4896 : 1976	One-percent chromium steel castings for resistance to abrasion (<i>first revision</i>)

A-3 RIVETS

IS No.	Title
1929 : 1982	Hot forged steel rivets for hot closing (12 to 36 mm diameter) (<i>first revision</i>)
2998 : 1982	Cold forged steel rivets for cold closing (1 to 16 mm diameter) (<i>first revision</i>)

A-4 BOLTS

1363 (Part 1) : 1984	Hexagon head bolts, screws and nuts of product grade C: Part 1 Hexagon head bolts (size range M5 to M36) (<i>second revision</i>)
1363 (Part 2) : 1984	Hexagon head bolts, screws and nuts of product grade C: Part 2 Hexagon head screws (size range M5 to M36) (<i>second revision</i>)
1363 (Part 3) : 1984	Hexagon head bolts, screws and nuts of product grade C: Part 3 Hexagon nuts (size range M5 to M36) (<i>second revision</i>)
1364 (Part 1) : 1983	Hexagon head bolts, screws and nuts of product grade A and B: Part 1 Hexagon head bolts (size range M3 to M36) (<i>second revision</i>)
1364 (Part 2) : 1983	Hexagon head bolts, screws and nuts of product grade A and B: Part 2 Hexagon screws (size range M3 to M36) (<i>second revision</i>)
2585 : 1968	Black square bolts and nuts (diameter range 6 to 39 mm) and black square screws (diameter range 6 to 24 mm) (<i>first revision</i>)
3138 : 1966	Hexagonal bolts and nuts

A-5 GEARS

2535 : 1978	Basic rack and modules of cylindrical gears for general engineering and heavy engineering (<i>second revision</i>)
3734 : 1983	Dimensions for worm gearing (<i>first revision</i>)
5037 : 1969	Basic rack and modules of straight bevel gears

A-6 CONCRETE

456 : 1978	Code of practice for plain and reinforced concrete (<i>third revision</i>)
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Bureau of Indian Standards

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Doc : No. HMD 6 (5253)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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